WHAT IS CLAIMED IS:

Claims

1. A method comprising

mounting a sourceless orientation tracker on a user's head, and

using a position tracker to track a position of a first localized feature associated with a limb of the user relative to the user's head.

2. The method of claim 1 in which the first localized feature associated with the limb comprises a point on a hand-held object or a point on a hand-mounted object or a point on a hand.

3. The method of claim 2, wherein the first localized feature is on a stylus-shaped device.

4. The method of claim 2, wherein the first localized feature is on a ring.

5. The method of claim 1 further comprising using the position tracker to determine a distance between the first localized feature and a second localized feature associated with the user's head.

6. The method of claim 1 in which the position tracker comprises an acoustic position tracker.

7. The method of claim 1 in which the position tracker comprises an electro-optical system that tracks LEDs, optical sensors or reflective marks.

8. The method of claim 1 in which the position tracker comprises a video machine-vision device that recognizes the first localized feature.

9. The method of claim 1 in which the position tracker comprises a magnetic tracker with a magnetic source held in the hand and sensors integrated in the headset or vice versa.

10. The method of claim 1 in which the position tracker comprises a radio frequency position locating device.

11. The method of claim 1 in which the sourceless orientation tracker comprises an inertial sensor.

12. The method of claim 1 in which the sourceless orientation tracker comprises a tilt-sensor.

13. The method of claim 1 in which the sourceless orientation tracker comprises a magnetic compass sensor.

14. The method of claim 1 further comprising:
mounting a display device on the user's head; and
displaying a first object at a first position on the display device.

15. The method of claim 14 further comprising:
changing the orientation of the display device; and
after changing the orientation of the display device, redisplaying the first object at a second position on the display device based on the change in orientation.

16. The method of claim 15, wherein the second position is determined so as to make the position of the first object appear to be fixed relative to a first coordinate reference frame, which frame does not rotate with the display device during said changing of the orientation of the display device.

17. The method of claim 16, wherein the first object is displayed in response to a signal from a computer.

18. The method of claim 17, further comprising:
mounting a wearable computer on the user's body, and wherein the first object is displayed in response to a signal from the wearable computer.

19. The method of claim 15, further comprising displaying a portion of a virtual environment on the display device.

20. The method of claim 19, further comprising:

displaying a portion of the virtual environment on the display device before changing the orientation of the display device, and displaying a different portion of the virtual environment on the display device after changing the orientation of the display device.

21. The method of claim 19, in which the virtual environment is a fly-through virtual environment.

22. The method of claim 19, in which the virtual environment includes a virtual treadmill.

23. The method of claim 15, further comprising displaying a graphical user interface for a computer on the display device.

24. The method of claim 23, wherein the first object is a window, icon or menu in the graphical user interface.

25. The method of claim 23, wherein the first object is a pointer for the graphical user interface.

26. The method of claim 16, further comprising:

changing the position of the first localized feature relative to the position tracker; and

after changing the position of the first localized feature, redisplaying the first object at a second position on the display device determined based on the change in the position of the first localized feature.

27. The method of claim 26, further comprising:

displaying a second object on the display device, wherein

after changing the position of the first localized feature, the displayed position of the second object on the display device does not change in response to the change in the position of the first localized feature.

28. The method of claim 26, wherein the second position is determined so as to make the position of the first object appear to coincide with the position of the first localized feature as seen or felt by the user.

29. The method of claim 17, further comprising:

changing the orientation of the first coordinate reference frame in response to a signal being received by the computer.

30. The method of claim 29, wherein the orientation of the first coordinate reference frame is changed in response to a change in the position of the first localized feature.

31. The method of claim 29, wherein the orientation of the first coordinate reference frame is changed in response to a signal representative of the location of the user.

32. The method of claim 29, wherein the orientation of the first coordinate reference frame is changed in response to a signal representative of a destination.

33. The method of claim 29, wherein the orientation of the first coordinate reference frame is changed in response to a signal representative of a change in the user's immediate surroundings.

34. The method of claim 29, wherein the orientation of the first coordinate reference frame is changed in response to a signal representative of a change in the physiological state or physical state of the user.

35. The method of claim 27, wherein redisplaying the first object further comprises changing the apparent size of the first object according to the change in position of the first localized feature.

36. The method of claim 1, further comprising:

mounting a portable beacon, transponder or passive marker at a fixed point in the environment; and

determining the position vector of a second localized feature associated with the user's head relative to the fixed point.

37. The method of claim 36, further comprising determining the position vector of the first localized feature relative to the fixed point.

38. The method of claim 36, wherein the position vector is determined without determining the distance between the second localized feature and more than one fixed point in the environment.

39. The method of claim 36, wherein the position vector is determined without determining the distance between the second localized feature and more than two fixed points in the environment.

40. The method of claim 36, further comprising:

mounting a sourceless orientation tracker on a second user's head; and

determining the position of a localized feature associated with the body of the second user relative to the fixed point.

41. The method of claim 16, further comprising:

displaying the first object at a third position;

after displaying the first object at the third position, changing the orientation of the display; and

after changing the orientation of the display, continuing to display the first object at the third position .

42. The method of claim 27, wherein the first object is a window in a wraparound computer interface.

43. The method of claim 26, wherein said changed position of the first localized feature is not within the field of view of the display when the first object is redisplayed.

44. The method of claim 43, further comprising:

displaying the first object at an apparent position coinciding with the position of the first localized object when the first localized object is within the field of view of the display.

45. The method of claim 1, further comprising:

positioning the first localized feature at a first point;

positioning the first localized feature at a second point; and

calculating the distance between the first point and the second point.

46. The method of claim 1, further comprising:

determining a position vector of the first localized feature relative to a second localized feature associated with the user's head; and

transforming the position vector based on an orientation of the user's head.

47. The method of claim 46, further comprising:

setting an assumed position for the user's head in a coordinate system; and

setting a position for the first localized feature in the coordinate system based on the assumed position of the user's head and said position vector.

48. The method of claim 47, where setting a position for the first localized feature further comprises:

measuring the orientation of the user's head relative to a fixed frame of reference.

49. The method of claim 47, further comprising:

setting a virtual travel speed and direction for the user; and

modifying the assumed position for the user's head based on the user's virtual travel speed and direction.

50. The method of claim 1, wherein the sourceless orientation tracker comprises a first inertial sensor, and further comprising:

mounting a second inertial sensor elsewhere on the user's body or in an object held by the user; and

tracking the position of one inertial sensor relative to the other.

51. The method of claim 14, further comprising:

mounting a video camera on the back of the user's head; and

displaying an image generated by the video camera in a portion of the display device.

52. A method comprising:

using acoustic or radio frequency signals to track a position of a first localized feature associated with a limb of the user relative to the user's head.

53. A tracking system comprising:

an acoustic or radio frequency position tracker adapted for mounting on a user's head,

said tracker being adapted to track a position of a first localized feature associated with a limb of the user relative to the user's head.

54. A tracking system comprising

a sourceless orientation tracker for mounting on a user's head, and

a position tracker adapted to track a position of a first localized feature associated with a limb of the user relative to the user's head.

55. A method comprising:

mounting a motion tracker on a user's head;

using a position tracker to track a position of a first localized feature associated with a limb of the user relative to the user's head;

positioning the first localized feature at a first point;

positioning the first localized feature at a second point; and

calculating the distance between the first point and the second point.

56. A system comprising:

mounting a first inertial sensor on a user's head;

mounting a second inertial sensor elsewhere on the user's body or in an object held by the user; and

tracking the position of one inertial sensor relative to the other.

57. The method of claim 56, further comprising:

sensing data at the first and second inertial sensors and using the sensed data to track the position of one inertial sensor relative to the other.

58. The method of claim 57, wherein tracking the position of the inertial sensor is done without reference to any signal received from a source not mounted on or held by the user.

59. The method of claim 58, wherein the drift of the relative position or orientation of the second inertial sensor relative to the first inertial sensor is corrected by measurements between devices on the user's head and devices elsewhere on the users body.